

Exploring the Potential of IBM Smarter Analytics Solutions

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By **Jean Francois Puget, Ph.D.**, IBM Distinguished Engineer, and **Baruch Schieber, Ph.D.**, IBM Research Staff Member

Highlights

By employing analytics, your enterprise can achieve the following goals:

- ▶ Drive real-time business decisions by using Smarter Analytics solutions.
- ▶ Identify and follow the best course of action that is based on facts and objective evaluation of alternatives.
- ▶ Make more confident choices and anticipate and mold business results in rapidly changing environments.
- ▶ Enable enterprise transformation by using information.

Challenges of adopting an effective analytics solution

The concept of analytics is based on mathematical principles. Although the term *analytics* started as simple descriptive statistics, it applies generally to the process of using data to derive insights to make better decisions. These insights can be presented through dashboards or other reporting tools, leaving the decision process to humans. Insights can also be used in automated decision management systems. Between these two extremes, insights can be used in a decision support function as part of a collaborative process between humans and machine.

With recent high profile predictions from statisticians, such as Nate Silver, analytics are hot topics in today's news. For example, by employing analytics, Silver accurately predicted the 2012 US presidential election. Also, by using analytics, computer models alerted meteorologists of the seriousness of the super storm Hurricane Sandy. In another setting, analytics helps to settle trades on the stock market in almost real time, reducing expenses for financial institutions by more than half.

Businesses today deal with a lot of information. Because the ability to collect data has increased exponentially in the last few decades, business leaders are increasingly focused on finding ways to use this data to gain a competitive advantage. By applying analytics, you can assimilate, digest, and act on data and information.

The need for analytics is pervasive. Every industry is seeing a massive expansion in the volume of data and an array of missed opportunities, such as the estimated US\$90 billion in missed sales because retailers do not have the right products. In addition, poorly managed risk presents an issue, such as the hundreds of millions of dollars in healthcare fraud every day.

The following companies demonstrate the benefit of analytics:

- ▶ Best Buy placed its focus on registered customers and analyzed their behavior to drive an 8 - 10 times improvement in advertising effectiveness to these customers while spending 5 - 7 percent less (opportunity creation).¹
- ▶ Alameda County Social Services used analytics to manage entitlements for citizens and to identify and eliminate fraud while better managing cases for a savings of US\$25 million annually (fraud reduction).²

¹ Best Buy testimonial about taking advantage of customer insight:

<http://www.youtube.com/watch?v=H8-0oab7sz0>

² Alameda County Social Services case study:

ftp://public.dhe.ibm.com/software/solutions/soa/pdfs/IBMR0ICasestudy_AlamedaCountySocialServ.pdf



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- ▶ Red Eléctrica de España, S. A., claimed a savings of EU€50,000 - EU€100,000 (US\$65,000 - US\$130,000) per day thanks to an optimized use of their electrical plants.³
- ▶ Netherlands Railways claimed a savings of EU€23 million (US\$30 million) a year, thanks to an optimized train schedule.⁴

Analytics can provide your enterprise with a better understanding of variability, future uncertainty, and your own clients. With the landscape constantly changing, you can gain a competitive edge by optimizing business processes, production planning, and human capital to make your business more efficient. IBM's approach to analytics is Smarter Analytics.

Current trends and challenges

The future of analytics is also driven by the following current trends:

- ▶ The availability of structured and unstructured data is exploding.
More data is being collected through web applications, user generated content, and instrumentation of the physical infrastructure. These types of data create opportunities for using analytics.
- ▶ Consistent, extensible, and usable analytics platforms are emerging.
The enterprise needs to address how to use the existing skill set to increase the coverage of business applications and solutions for analytics.
- ▶ Systems throughout the enterprise are being optimized to deploy analytics solutions.
Analytics can become a dominant IT workload that can drive the hardware design of the enterprise, providing the opportunity to scale to accommodate this workload.

The successful use of analytics requires a combination of skills and prerequisites:

- ▶ Data must exist and must be of good quality.
- ▶ The business process and objectives must be clearly understood.

³ Red Eléctrica de España, S. A., case study:
<ftp://public.dhe.ibm.com/common/ssi/ecm/en/wsw14064usen/WSW14064USEN.PDF>

⁴ Netherlands Railways case study:
<ftp://public.dhe.ibm.com/common/ssi/ecm/en/odc03170usen/ODC03170USEN.PDF>

- ▶ The business must be flexible to allow actions to occur as a result of analytics.
- ▶ The business problem must be such that you can translate it into models so that you can track it with current analytics technology.

This combination of prerequisites triggers a unique set of challenges:

- ▶ How can you efficiently use uncertain or incomplete data in an analytics application?
- ▶ How can you design an effective decision-making system when one part of that system includes human interaction?
- ▶ How can you make analytics socially and organizationally acceptable?
- ▶ How can you grow the number of people with the correct skills to apply analytics to a business problem?
- ▶ What learning tools, sandbox environments, education, and academic partnerships to train students or other resources need to be devised?
- ▶ How can you simplify the modeling process by using more powerful tools? Can you define a unified reference architecture, with an integrated software and hardware offering, that makes analytics easier to use and deploy?

Today's enterprises need to adopt analytics solutions that are reasonably priced and simple to use, yet robust enough that users can realize the value of the solution.

IBM offers a broad, integrated portfolio of information and analytics capabilities, spanning software, hardware and services. You can deploy these capabilities to take advantage of all of your data sources.

Analytics: Effectively using all that information

The insight that is gained from the available data can vary in its complexity. In its simplest form, analytics presents data in concise reports so that you can make simple queries and receive the answers that you need to make the best decision. In its most complex form, you can use analytics to collect, report, and ingest available data to predict future trends and events.

Then, you can apply this knowledge to determine the best actions to take next, as illustrated in Figure 1.

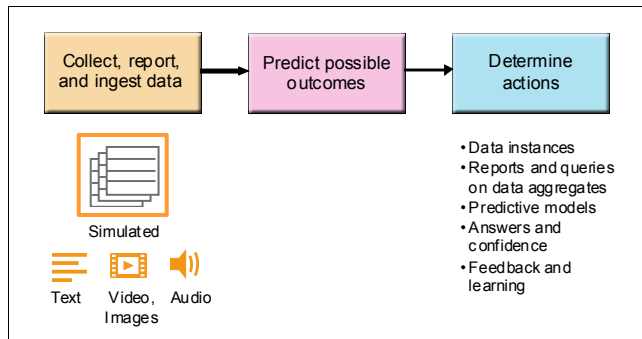


Figure 1 Using analytics to predict possible outcomes

The ways in which you use analytics technologies fall into the following categories:

- **Descriptive analytics** provides information about the past state or performance of a business and its environment. It needs data that is already stored (for example, in a database). Therefore, by definition, descriptive analytics provides a view of the past, even if the past happened a second ago.

Descriptive analytics provides regular reports for events that already happened and ad hoc reports to help examine facts about what happened, where, how often, and with how many. It includes the capability to perform individual queries so that someone can investigate the exact problem.

- **Predictive analytics** helps predict (based on data and statistical techniques) with confidence what will happen next so that you can make well-informed decisions and improve business outcomes.

Predictive analytics relies on historical data, real-time events, and alerts. It employs statistical analysis and simulation models to suggest what could happen.

For example, with this data, you can apply predictive analytics so that you can perform the following tasks:

- Forecasting, which is a process of making statements about events whose outcomes have not yet been observed
- Predictive modeling for what-if situations or scenarios
- **Prescriptive analytics** recommends high-value alternative actions or decisions for a complex set of targets, limits, and choices. *Optimization* is used to examine how you can achieve the best outcome for a particular situation. It shines when there is no practical way to show the breadth of information or

its complexity to human experts in a way that they can make decisions. *Stochastic optimization* recommends how you can mitigate or avoid uncertain risks. Therefore, prescriptive analytics takes into account all possible future outcomes, with their respective probability. It suggests courses of actions so that the expected benefit is maximized and potential negative outcomes are avoided.

In addition to the traditional view of analytics, new data sources are now available. These new data sources are mostly unstructured data, such as image data, information from sensors, or comments that are made by people on a blog. This unstructured data poses challenges to analytics because it must be understood before it can be analyzed. Two examples of unstructured data include counting cars by using traffic video feeds or inferring the sentiment of a customer from the customer's blog review.

The prescriptive layer needs to be extended to add the capabilities of optimization under uncertainty, because the data that is used to make a decision might be incomplete or even inaccurate. Also, given that a lot of data is available in almost real time, the capability of continual analytics that acts upon the data as it arrives is a new requirement.

Recent advancements in computing, including raw computing power, algorithms, and methods, drive the need for competitive analytic solutions. As illustrated with the IBM Watson™ Jeopardy player, the raw computation power of the system is a must. But without the recent advances in natural language processing (NLP) and machine learning that are built upon decades of research, such an achievement might not be possible.

Developing an analytics solution

Many companies are applying Smarter Analytics, commonly referred to as *Business Analytics and Optimization* (BAO) in industry solutions. These solutions can help you to better understand customers, to drive real-time decisions, to foster fact-based decision-making, and to increase organizational collaboration and productivity. Smarter Analytics helps you to identify and follow the best course of action that is based on facts and objective evaluation of alternatives. By implementing Smarter Analytics solutions, you can make more confident choices and can anticipate and mold business results in rapidly changing environments.

Smarter Analytics uses information to enable enterprise transformation and creates sustainable differentiation by using the following tools:

- ▶ Advanced information management and analytical services
- ▶ Deep industry and domain expertise
- ▶ World-class solutions that are required to address complex business
- ▶ Societal opportunities across the entire value chain of an entity

Smarter Analytics empowers decision-making. It delivers intelligence through a combination of predictive insight, smarter technology, and industry frameworks and accelerators to optimize decisions and to improve performance. It provides a solid information and analytics foundation. It addresses the needs of a more instrumented, interconnected, and intelligent world.

IBM Smarter Analytics solutions connect people with trusted information so that they can make real-time decisions and act with confidence in delivering better business outcomes. By working to plan an information agenda, master information, and apply business analytics, you can take advantage of the following areas:

- ▶ Information management
- ▶ Enterprise Content Management (ECM)
- ▶ Business analytics technology
- ▶ Expertise to confidently understand, predict, plan, and act to optimize business outcomes

What's next: How IBM can help

IBM has invested in the analytics area for years, organically in research and development spending and inorganically in acquisitions. In addition to its large analytics portfolio, IBM has unparalleled skills in the analytics area:

- ▶ Analytics Solutions Centers worldwide
- ▶ More than 10,000 technical analytics professionals
- ▶ Over 9,000 consultants who deliver IBM analytics solutions
- ▶ The world's largest mathematics department in a private industry
- ▶ First of a Kind (FOAK) breakthrough innovations, including IBM Watson

IBM Smarter Analytics includes the following competency areas that bring together critical skills that

are necessary to define and drive IBM leadership in the growing analytics market:

- ▶ By using the *IBM Smarter Analytics Strategy*, you can achieve business objectives faster, with less risk, and at a lower cost. You can define and help to implement improvements in how information is identified and acted upon. Applied enterprise-wide and deep within a business function, this strategy addresses what to do and how to do it with actions that span policy, analytics, business process, organization, applications, and data.
- ▶ *Business Intelligence and Performance Management* empowers decision making and improved business performance through timely access, analysis, and reporting of actionable, accurate, and personalized information. Organizations can translate strategies into actionable forecasts or plans, monitor key financial and operational metrics, and improve insight, corresponding actions, and ultimately performance throughout the enterprise.
- ▶ *Advanced Analytics and Optimization* enhances organizational performance by applying advanced mathematical modeling, deep computing, simulation, data analytics, and optimization techniques to improve operational efficiency. Operational efficiency is accomplished by using analytical engines, data mining, and statistical models that address specific business-process areas.
- ▶ *Enterprise Information Management* applies methods, techniques, and technologies that address data architecture, extraction, transformation, movement, storage, integration, and governance of enterprise information and master data.
- ▶ *Enterprise Content Management* includes services, technologies, and processes that are used to improve the capture, management, storage, access, preservation, and electronic discovery of unstructured content. It focuses on management of unstructured content and on drawing value from content through improved information management, business processes, and advanced analytics. These capabilities help clients improve the performance of their businesses by reducing costs and driving efficiencies.

In addition, you can draw on the extensive experience with advanced analytics solutions that IBM Global Business Services® offers. This group has services to design, implement, and manage Smarter Analytics Signature Solutions and provides any level of support that your business needs.

Resources for more information

For more information about the topics in this paper and about IBM Smarter Analytics solutions, see the following resources:

- ▶ *Smarter Analytics: Making Better Decisions Faster with IBM Business Analytics and Optimization Solutions*, REDP-4886
<http://www.redbooks.ibm.com/abstracts/redp4886.html?Open>
- ▶ *Smarter Analytics: Driving Customer Interactions with the IBM Next Best Action Solution*, REDP-4888
<http://www.redbooks.ibm.com/abstracts/redp4888.html?Open>
- ▶ IBM Smarter Analytics
<http://www.ibm.com/analytics/us/en>
- ▶ H.G. Courtney. "Making the most of uncertainty," *McKinsey Quarterly*, November 2001.
- ▶ H.G. Courtney, J. Kirkland, and S. P. Viguerie. "Strategy under Uncertainty," *McKinsey Quarterly*, June 2000.
- ▶ T.H. Davenport and J.G. Harris. *Competing on Analytics: The New Science of Winning*, Harvard Business School Press, March 2007.
- ▶ T.H. Davenport, J.G. Harris, R. Morison. *Analytics at Work: Smarter Decisions, Better Results*, Harvard Business Review Press, February 2010.
- ▶ H. J. Greenberg. "Representing uncertainty in decision support," *OR/MS Today*, June 2007.
- ▶ Irv Lustig, Brenda Dietrich, Christer Johnson, and Christopher Dziekan. "The Analytics Journey," *Analytics Magazine*, November/December 2010
<http://www.analytics-magazine.org/november-december-2010/54-the-analytics-journey>
- ▶ *Analytics Magazine*
<http://www.analytics-magazine.org>
- ▶ *Interfaces Journal*
<http://interfaces.journal.informs.org>
- ▶ *OR/MS Today*
<http://www.orms-today.org>

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